***PUBLIC HEALTH IN ACTION: PAST & PRESENT***

New York City, 1947

Index Case

* Man on way from Mexico to Maine
* Falls ill in NYC, March 1
  + Goes to Bellevue for fever, rash
  + Admitted to dermatology ward
  + Transferred to Willard Parker ID hospital with unknown diagnosis
  + Mar 10: dies, dx: bronchitis with hemorrhage
  + 2 more cases develop 
    - Smallpox suspected
    - Willard Parker staff vaccinated

Keep in Mind

* Smallpox hadn’t been seen in over a generation
* In NYC, ~2 million out of 7.5 million had any immunity

Further Developments

* April 4: Lab reports smallpox
* April 5: NYC Health Commissioner and Hospital Commission announce to public
  + Threat slight
  + Vaccination important
  + Alternative Care Sites –places are nontraditional patients that you deliver care

Two-Pronged Attack

* Mass Vaccination Campaign
* Case-tracing
* US PHS wades in also

To Win Public Confidence

* Daily press conferences
  + Announcements of suspected/confirmed cases
* Coordination among city, state, & Federal agencies
* Smallpox signs distributed
* Lapel buttons
  + “Be safe. Be sure. Get vaccinated”
* Radio shows about Smallpox

Enough Vaccine?

* Drug companies hesitant about supplies and cost of vaccine.
* Mayor O’Dwyer had them in City Hall
  + Ultimatum: Make more vaccine, make it cheaply, or won’t leave building!

Vaccination Campaign

* Free, voluntary
  + Health Dept. had authority to remove people forcibly and to demand vaccination
  + Authority not used; coercion not needed
  + Assistance of local volunteer groups
* Hospitals, doctors’ offices, health department clinics
* 13 hospitals, 84 police precincts, public and private schools

Public Confidence & Trust High

* —First 2 weeks: 5 million vaccinated —
* In 2 weeks: 6.35 million vaccinated
  + Mayor vaccinated
  + President Truman vaccinated
  + Final results
    - Expected <5,000 cases
    - Actual: 12 cases, 2 dead

Why Successful?

* American mentality
* Post-war
* Emergency mentality still in force
* Trust in government continues
* Strong Public Health infrastructure
* Public treated as associates in common problem

***AN UNUSUAL CASE OF TERRORISM 2002-2003***

12/31/02-1/01/03

* Four families (18 members) complain to one supermarket in Michigan of becoming ill following the consumption of ground beef they bought there.
* Symptoms include
  + Burning of the mouth
  + Nausea, vomiting.
  + Dizziness
  + One case of atrial fibrillation treated at a local ED

1/03/03

* The supermarket notifies the Michigan Department of Agriculture (MDA) Food and Dairy Division and the US Department of Agriculture (USDA)
* Recall 1,700 lbs. of ground beef because of customer complaints.

1/08/03

* The supermarket issues a press release about the recall of all ground beef with a “sell-by” date between 1/01/03 and 1/03/03.
* After the initial recall, 36 other customers report illness associated with the ground beef.
* 120 customers return the tainted product.

1/10/03

* The supermarket notifies MDA that their own independent lab determined that the beef was contaminated with **nicotine** (300mg/kg in submitted beef samples).
* The USDA and the FBI become involved in the investigation

1/17/03

* The supermarket issues a press release that the ground beef in question contains unspecified non-bacterial contaminants that are unable to be rendered harmless by cooking.
* The contamination appears to be localized at the one supermarket since other supermarkets receiving the beef from one meat processing plant report no problems.

1/23/03

* The local health department alert local EDs and selected medical practices about the situation.

1/24/03

* The supermarket issues a press release that the contaminant was nicotine.

Health Department Activities

* Develops a case definition
* Conducts epidemiological investigation
  + 148 interviews
    - 92 persons had illness consistent with the case definition
    - Median age: 31 yrs. (range: 1-76 yrs.)
    - 50% female
    - Cases occurred immediately after sale and as late as 49 days after sale suggesting that the beef was frozen for later consumption
    - 3% sought medical attention

2/12/03

* Grand jury indicts one disgruntled supermarket employee with the intentional poisoning of 200 lbs. of ground beef with nicotine.
* Source of the nicotine was from an insecticide called Black Leaf 40 (40% nicotine).

***BATS ON A PLANE***

August 5, 2011

* At 6:45 a.m.: A commercial airliner carrying 50 souls from Wisconsin to Georgia.
* Shortly after takeoff, a bat flew from the rear of the aircraft through the cabin several times before being trapped in the lavatory.
* The aircraft returned to the airport.
* All passengers disembarked to allow maintenance crew  members to remove the bat from the aircraft.
* The bat escapes.

WI Department of Public Health

* On August 8, WDPH was notified of a news report describing the incident
* WDPH requested assistance from CDC to conduct a multistate investigation, assessing the potential risk for rabies and the need for rabies post-exposure prophylaxis among passengers, the flight crew, and ground crew members associated with the flight.

Epi Team in Action

* In all, CDC interviewed 45 (90%) of the 50 passengers on board the initial flight and confirmed that none had physical contact with the bat or exposure to its saliva, and all were alert during the flight.
* The 45 passengers were residents of 11 states. They ranged in age from 2 to 63 years (mean: 41.2 years), and 24 (53%) were male. Two passengers reported having been vaccinated previously against rabies.
* The airline conducted the risk assessment of the two pilots, one flight attendant, and 16 ground crew members associated with the flight.
  + None of the airline personnel reported contact with the bat, bat saliva, or altered alertness during the incident.

Decision

* Post-exposure prophylaxis not indicated

***DELIRIUM OF UNKNOWN ETIOLOGY***

The Presentation

* In late December 2010
* A male resident of Wisconsin, aged 70 years, sought treatment for progressive right shoulder pain, tremors, abnormal behavior, and dysphagia at an ED.

Progression

* Admitted for observation
* Treated with benzodiazepines and haloperidol for  presumed alcohol withdrawal syndrome.
* Next day: Rhabdomyolysis, fever, and rigidity
  + Neuroleptic malignant syndrome was diagnosed.
* The patient worsened
  + Encephalopathy, respiratory failure, acute renal failure requiring hemodialysis, and episodes of cardiac arrest.

The Diagnosis

* The patient died on hospital day 13.

Once diagnosis made....

* Hospitals and DPH staff members initiated contact investigation interviews with the patient’s family, friends, and health-care providers to determine the extent of exposure and need for post-exposure prophylaxis
* 176 health-care workers + patient’s family assessed

***A MIGRANT FARM WORKER WITH FATIGUE AND SHOULDER PAIN***

Chief Complaint

* On July 29, 2010, a previously healthy male, aged 19 years, from Michoacán, Mexico, arrived at a sugarcane plantation in Louisiana.
* After 1 day of work in the fields, the patient sought medical attention on July 30 for generalized fatigue, left shoulder pain, and left hand numbness attributed to overexertion.

Physical Examination

* Hyperesthesia of the left shoulder, weakness of the left hand, generalized areflexia, and drooping of the left upper eyelid.
* LP: a mildly elevated white blood cell count of 8 cells/ mm3 with 67% lymphocytes and 12% neutrophils, a normal glucose, and no organisms on staining.
* Initial Dx:
  + Miller-Fisher variant of Guillain-Barré syndrome
  + Viral encephalitis
  + Early bacterial meningitis

When the results returned normal...

* Bacterial, viral, and fungal cultures of blood and CSF: Negative.
* Lab tests for HIV, syphilis, herpes simplex virus, arboviruses, Lyme disease, and autoimmune neuropathies: Negative.
* No history of animal exposures was known at that time
* A diagnosis of ? was suspected based on the clinical history  and available data.
* The Louisiana Office of Public Health was informed of the potential case of ?
* Infection control precautions were instituted on August 13, the 11th hospital day.

Interventions

* Public health authorities in Louisiana and Mexico interviewed the patient’s family members, friends, and coworkers to identify potential exposures.
* In total, 95 of 204 (46.5%) patient contacts received prophylaxis. Of these, 27 were coworkers who reported sharing a drinking vessel with the patient, and 68 were health-care workers with various exposures.

***A NURSING HOME UNDER FIRE***

Promenade Rehabilitation and Health Care Center

* 140 Beach 114th Street
* Under fire
* Rockaway Park, Queens
* Allegedly, failed to provide the most basic care to its patients, according to interviews with five employees, federal, city and hospital officials, and shelter directors.

As Sandy approached

* The State Health Department ordered all nursing homes (this is a law)
  + to stay at 150 percent of normal staff levels
  + to stock three days’ worth of food and medicine
  + to make sure to have a working generator in case power failed.

October 29

* Hurricane Sandy blew out Promenade’s windows and sending waves washing through the first floor.
* Generator on first floor disabled
* Back-up didn’t kick in.
  + Note: A nursing home sits on either side of Promenade. Each had a generator placed off the ground or walled-off from the water. Promenade’s generator, by contrast, sat closer to ground level.

Hungry, cold, and in the dark

* Patients remained inside in the dark, growing steadily more hungry and cold
* The kitchen had flooded, and the owners had not stocked enough food, staff members say.
* One nurse: “It was scary; we were all petrified....We tried not to show that to the patients.”
* Some workers failed to show up for assigned shifts.

Good Samaritans

* Next day
* Staff at Park Nursing Home took pity and slapped together 150 sandwiches for the staff members and patients of Promenade.

To the rescue?

* Dr. Shah, NYS Health Commissioner, asked for help from the hospitals of North Shore-LIJ Health System, which sent two safety officers out to the Rockaways at first light that Tuesday.
* Every street the officers tried was blocked by floodwaters or fire trucks fighting a blaze several hundred feet from the nursing home.

Finally, that evening

* Ambulances arrived
* EMS struggled to carry wheelchairs and patients with severe dementia down the stairs to waiting ambulances.
  + But some records and medications did not follow.
* Nearly 200 patients evacuated over several hours
* Deposited in emergency shelters in the city.
  + About 100 placed in four dimly lighted classrooms at Brooklyn  Technical High School in Fort Greene, Brooklyn.
  + Finger-stick and other blood tests

Possible Violations

* In most cases, allegedly, no Promenade staff member accompanied the patients
* Many patients traveled without their medical records.
* Both are violations of state regulations.

As of November 9...

* Some family members were still desperately searching for their loved ones
* No help from Promenade staff
* These patients were found in various emergency shelters or landed in cots and beds in hospitals and nursing homes across the region.

NY Times interviews with employees

* Promenade, allegedly, failed to carry out basic responsibilities
  + Adding staff for the storm as required by the state,
  + Stocking enough medicine and flashlights
  + Preparing patients’ records in case of evacuation.
* During Hurricane Irene, Promenade allegedly sent its patients off without staff members and often without medical records.
  + The State Health Department did not investigate or fine Promenade in that case.

Curiouser and curiouser...

* The nursing home administrator, who runs the home day to day, left the city — on what he said was a “personal matter” — on Oct. 28, as the hurricane approached.
* The nursing director left the next afternoon to check on her sick husband;
  + She did not return until Oct. 30, after the storm had blown over.

Dr. Nirav R. Shah, NYS health commissioner

* “My only priority is patient safety and health, and everything you’ve asked about Promenade flies in the face of that.”
* “We are investigating aggressively.”

How much of the fault was NYS?

* A year ago, when a less-powerful Tropical Storm Irene loomed, Dr. Shah ordered many nursing homes in the Rockaways to evacuate.
* But he declined to do so last week in the face of Hurricane Sandy, even though the nursing homes lay in an evacuation zone.

What would you do?

* Dr. Shah said he gave the homes the option of not evacuating, based on the risks of moving the elderly and the frail.
* Nursing homes complained bitterly about the cost of evacuations last year during Irene.
* Monday quarterbacking?

Promenade’s owners....

* Blamed the storm and state officials for the nursing home’s problems.
* The nursing home had increased its staffing for the storm to 150 percent and had enough medicine, flashlights and food.
* “What was crazy is the New York State Department of Health told us not to evacuate before the storm, so we sheltered in place,” one owner said. “I had to call them about 100 times before I was able to get the Office of Emergency Management to get them out.”
* The patients all got out safely; no related deaths.

He said, she said....

* Dr. Shah and four Promenade workers dispute nearly every one of owner’s assertions
* Shah: “I was talking to managers in just about every facility except Promenade. Not only did we not hear from them; we actively tried to contact Promenade and heard nothing.”

No Database

* The State Health Department has not yet completed a database that would help family members find loved ones.
* Louisiana put in place such a system in 2008 after Hurricane Gustav.

Physicians at the Vanguard

***AN UNUSUAL HAPPENING IN THE BIG APPLE***

Case 1.

* Mr. and Mrs. New Mexico travel to NYC
* November 5, 2002
* The man (53 years) seeks medical care in a NYC ED after consulting with his physician in New Mexico and the physician at the hotel at which he was staying.

In the ER

* 2 days of fever, fatigue, and painful unilateral inguinal swelling.
* P/E: Appears ill with diaphoresis, rigors, and lower  extremity cyanosis.
* T: 104.4o F (40.2o C), B/P: 78/50 mm Hg, SaO2: 98% (21%)
* P/E: Tender left inguinal adenopathy with overlying edema.
* WBC: 24,700/*μ*L , platelet count: 72,000/*μ*L
* A blood culture grew *????*. –yersinia pestis
* Gram stain of the blood culture isolate revealed bipolar gram- negative rods with a "safety pin" appearance.

The patient's condition deteriorates

* Admitted to ICU in shock with a diagnosis of septicemic ??????, acute renal failure, acute respiratory distress syndrome, and disseminated intravascular coagulation.
* Required hemodialysis and mechanical ventilation
* Bilateral foot amputations
* After a 6-week ICU stay, he recovered and was discharged to a long-term-care rehabilitation facility.

Case 2: The Wife

* November 3, the wife, aged 47 years, of patient 1 also became ill.
* November 5, she sought medical care for fever, fatigue, myalgias, and unilateral inguinal swelling.
* P/E: Tender right inguinal and femoral adenopathy
* T:102.2o F (39.0o C), B/P: 120/72 mm Hg, SaO2: 98% (21%).
* WBC: 9,500/*μ*L, platelet count: 189,000/*μ*L.
* Hospitalized and treated with gentamicin, doxycycline, and ticarcillin-clavulanic acid, followed by a 14-day course of oral doxycycline 100 mg twice daily
* She recovered without complication.

NYC Response

* The hotel physician notified the ED about the patients and the need for respiratory isolation pending the exclusion of pulmonary infection.
* Hospital infection-control and administration personnel were contacted to coordinate appropriate in-hospital precautions and education.
* The NYC Department of Health and Mental Hygiene, the NYSDOH, NMDOH, and CDC were contacted to facilitate diagnostic testing, coordinate public health response, and assess the possibility of terrorism.

Reassurance

* After determining that these two cases probably were acquired naturally, a press conference was held to reassure the public that the exposures had occurred in New Mexico, a known endemic area, and not in NYC.

***DISCOVERING AN EPIDEMIC IN THE U.S.***

It all started in NYC, 1999

A phone call

* August 23, 1999 (Monday)
* Deborah Asnis
  + Physician at Flushing Hospital Medical Center (Queens) 
* Calls Marci Layton
  + Chief Epidemiologist, NYC DOH

Reason: Two Puzzles

* 60 year-old male & 75 year-old male
* Dr. Asnis’ patients
* Both
  + Lost use of arms and legs 
  + High fevers 
  + CSF leukocytosis 
  + Confused

A plan

* Blood and CSF specimens to be sent to state lab in Albany

Another phone call

* Friday, August 27, 1999
* Dr. Asnis reports on two more patients
  + 80 year-old male
  + 87 year-old female
* Another neurologist overhears conversation
  + Has another similar encephalitic patient in another hospital

NYC DOH Makes a Visit

* + Saturday, Layton & Annie Fine visit Flushing Hospital to review cases
  + Three now on mechanical ventilators
  + Commonality: All lived within same two-square-mile area of northern Queens

Simultaneous Admission at Flushing Hospital

* 57 year-old male
  + Fever, combative, hallucinatory
  + Came from same neighborhood as others

At End of Weekend

* Eight additional patients with similar manifestations identified in hospitals in Queens.

CDC

* Sunday:
  + Layton calls CDC for assistance
* Tuesday:
  + EIS (Epidemic Intelligence Service, CDC) Officer Kristy Murray arrives
  + More cases appear
* Wednesday:
  + Murray visits hospitals
    - Reviews patient charts
    - Interviews patients
  + Denis Nash (EIS at NYC AIDS unit)
    - Visits patients’ homes with exterminator, animal-disease expert, entomologist

Clue

* At one patient’s home, Nash’s team discovers
  + Mosquito Paradise: Standing water (birdbath), thick grass
* Patient and other patients were avid gardeners
* Patient taken off life support

Another death

* Thursday
* 87 year-old lady dies

Lab Results

* Friday
* NY & CDC tests
  + Positive for St. Louis Encephalitis (SLE) viral antibodies in blood and CSF specimens

Mayor Giuliani

* Press conference
* Choppers spray pesticides over Queens

Disease Spreads

* Next few weeks
* Cases crop up in The Bronx and Brooklyn
* CDC dispatches more officers

Encephalitis Hotline

* 130,000 calls
* Overwhelmed

Banner Headlines

* “Killer Bug”
* “Let Us Spray!”
* Pesticide campaign involves entire city
  + Case shows up in Manhattan

Callers Into Hotline

* Dead crows all over
* Connection?

Bronx Zoo

* Crows, flamingo, cormorant, pheasant, bald eagle: All dead
* Zoo’s veterinary pathologist, Tracey McNamara
  + Sends specimens to National Veterinary Services Laboratories (Iowa)
    - Lab isolates virus
    - Virus analyzed by CDC at Ft. Collins, CO

Door-To-Door

* October
* EIS collect blood samples from families in Queens
  + 3% had antibodies to WNV
* Estimate
  + At least 8,200 residents had the disease
    - Most asymptomatic

November, 1999

* NYC epidemic concluded
* 62 confirmed cases
  + Survivors
    - 1.5 years later: Needed assistance with chores of daily living
  + 7 deaths

***EXACTLY WHAT IS PUBLIC HEALTH?***

Public Health

* Credited with adding 25 years to the life expectancy of people in the United States in this century.
  + CDC

CDC’s Description

* The active protection of our nation′s health and safety,
* The provision of credible information to enhance health decisions (educate the health care population in ways of maintaining good health), and
* The development of partnerships with local minorities and organizations to promote good health.
  + CDC

**10 Essential Public Health Services (TEST QUESTION MAYBE)**

* **Monitor** health status to identify community health problems.
* **Diagnose and investigate** health problems and health hazards in the community.
* **Inform, educate, and empower** people about health issues.
* **Mobilize** community partnerships to identify and solve health problems.
* **Develop policies and plans** that support individual and community health efforts.
* **Enforce** laws and regulations that protect health and ensure safety.
* **Link** people to needed personal health services and assure the provision of health care when otherwise unavailable.
* **Assure** a competent public health and personal healthcare workforce.
* **Evaluate** effectiveness, accessibility, and quality of personal and population-based health services.
* **Research** for new insights and innovative solutions to health problems.

Public Health... What Comes to Mind? (TEST QUESTION MAYBE)

* Conventional ideas
  + Services for the Poor
  + Sanitation and Clean Water
  + Restaurant Inspections
  + STIs and TB Clinics
* Contemporary application
  + Handgun Control
  + Responding to Antimicrobial Resistance (MRSA)
  + West Nile Virus
  + Pandemic/Avian Flu
  + Childhood Obesity
  + Public Health Preparedness/Disasters
  + Terrorism
  + Addressing Disparities in Health Care/Health and Human Rights

Lucas County Public Health

* Education: CV, HIV
* Disaster response services and disaster preparedness education and  awareness to the community
  + Medical Reserve Corps
* Advanced Practice Center: to serve the public health community, providing resources ranging from training tools to prepare for and respond to mass casualty incidents to public education materials to tools to help you reach vulnerable populations.
* Environmental Health: Food, Septic tanks/wells, rodent control, housing, lead poison prevention, tattooing; infant mortality review, Human trafficking
* Health Services: WIC, dental, etc.

Wood County: Health Services

* Breastfeeding Promotion
* Child Fatality Review Board
* Dental Care
* Diabetes
* Fetal Alcohol Syndrome
* Flu vaccine
* Help Me Grow
* Immunizations
* Medical Care: Preventive/ Primary
* Infectious Diseases
* Influenza (Flu)
* Lead Poisoning
* Pharmacy Network
* Screenings
* Tobacco
* Travel Vaccines
* West Nile Virus

Wood County: Environmental Services

* Birth and Death Records
* Disaster Preparedness
* Flooding Safety
* Food Inspections
* Food Safety
* Permits and Licenses
* Rabies and Dog Bites
* Sewage Program
* Tattoo and Piercing Risks

Actual causes of death in the US (not on test)

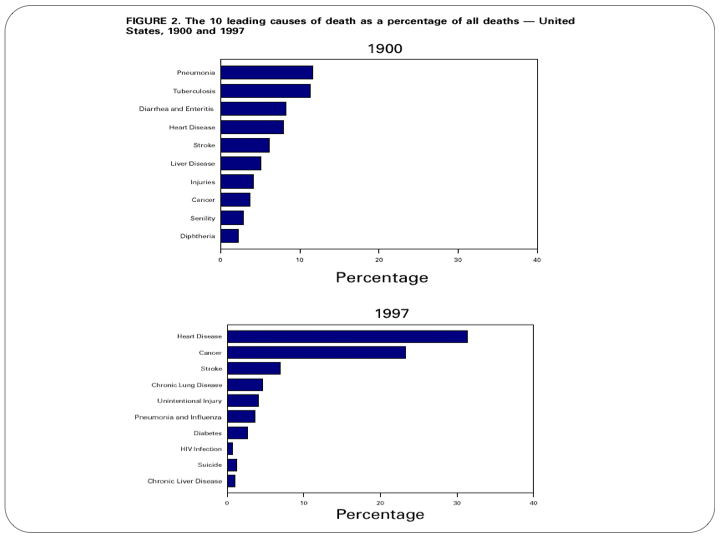
* Half of all deaths result from nine causes.
  + - **1990 2000**
* Tobacco 400,000 (19%) 435,000 (18.1%)
* Poor Diet and 300,000 (14) 400,000 (16.6)

Physical inactivity

* Alcohol 100,000 (5) 85,000 (3.5)

consumption

* Microbial agents 90,000 (4) 75,000 (3.1)
* Toxic agents 60,000 (3) 55,000 (2.3)
* Motor Vehicle 25,000 (1) 43,000 (1.8)
* Firearms 35,000 (2) 29,000 (1.2)
* Sexual Behavior 30,000 (1) 20,000 (0.8)
* Illicit drug use 20,000 (<1) 17,000 (0.7)
* Total 1,060,000 (50) 1,159,000 (48.2)

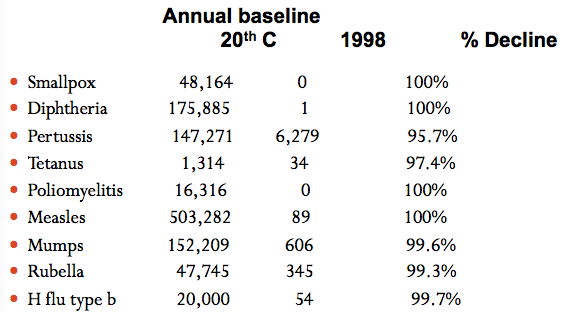


**CDC’s Ten Great Public Health Achievements in the 20th Century (PROB ON EXAM-memorize it)**

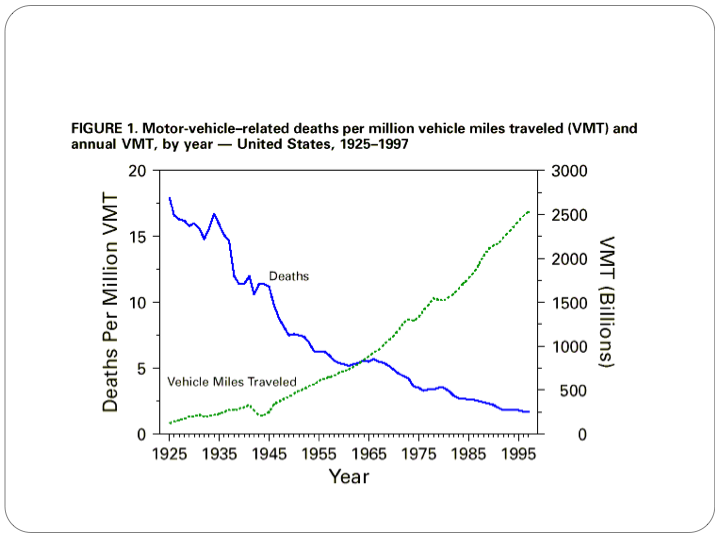
* Immunizations
* Motor-Vehicle Safety 
* Workplace Safety
* Control of Infectious Diseases
* Declines in Deaths from Heart Disease and Stroke
* Safer and Healthier Foods
* Healthier Mothers and Babies 
* Family Planning
* Fluoridation of Drinking Water
* Tobacco as a Health Hazard

Immunizations

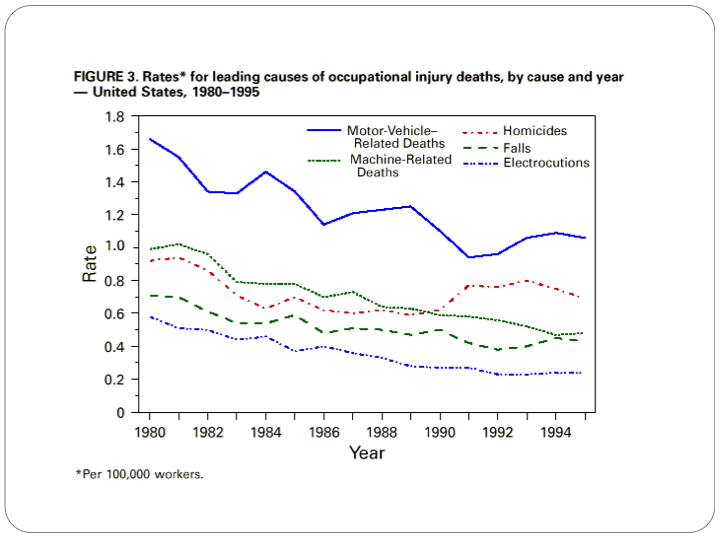
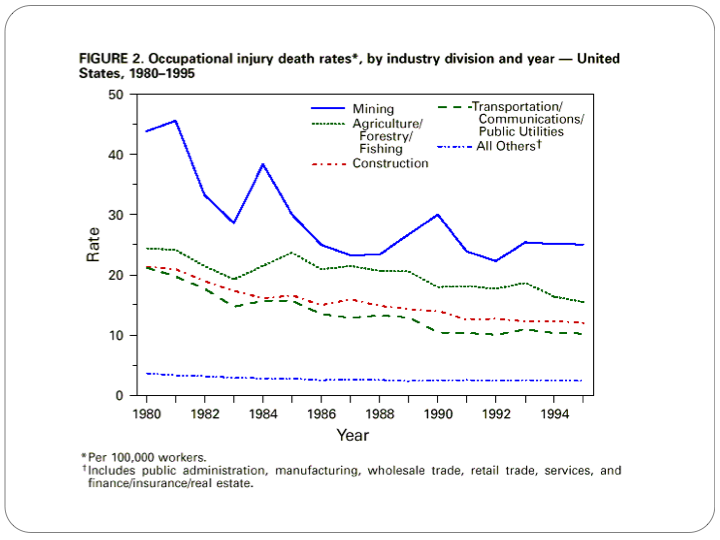
* Vaccine-preventable diseases
  + Smallpox 1798
  + Rabies 1885
  + Typhoid 1896
  + Cholera 1896
  + Plague 1897
  + Diphtheria 1923
  + Pertussis 1926
  + Tetanus 1927
  + Tuberculosis 1927
  + Influenza 1945
  + Yellow fever 1953
  + Poliomyelitis 1955
  + Measles 1963
  + Mumps 1967
  + Rubella 1969
  + Anthrax 1970
  + Meningitis 1975
  + Pneumonia 1977 
  + Adenovirus 1980 
  + Hepatitis B 1981 
  + H influenzae type b 1985 
  + Japanese encephalitis 1992
  + Hepatitis A 1995
  + Varicella 1995
  + Lyme disease 1998
  + Rotavirus 1998



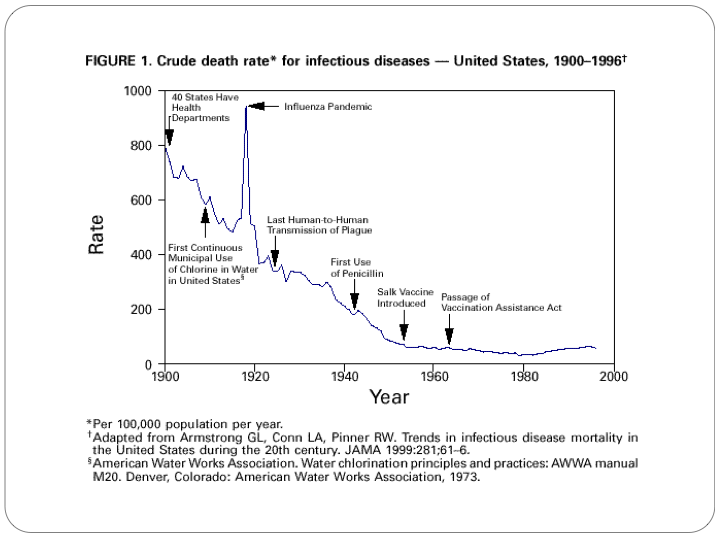
Motor-Vehicle Safety

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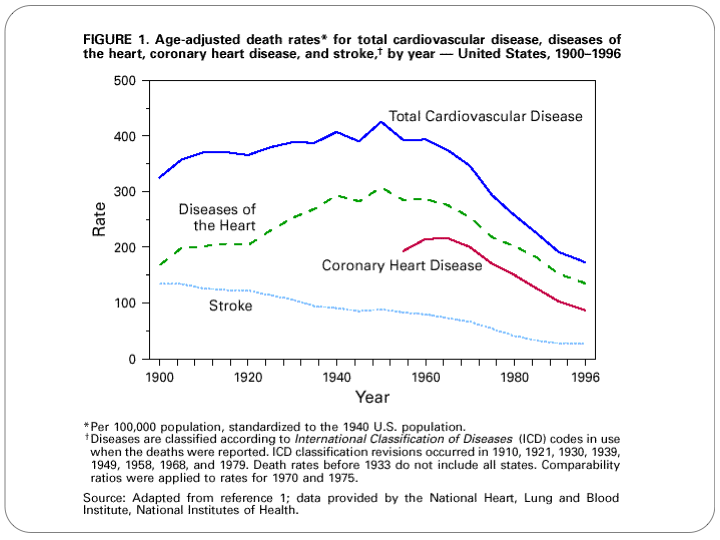
Workplace Safety

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Control of Infectious Diseases

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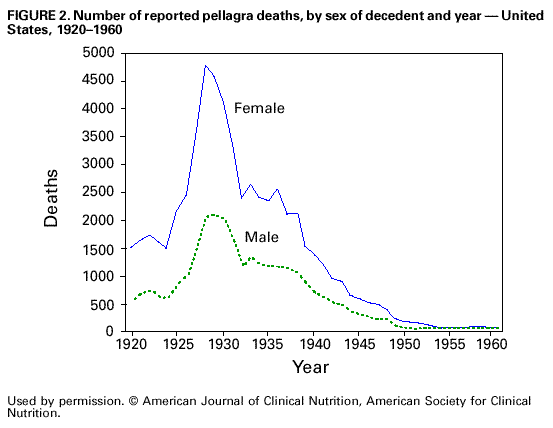
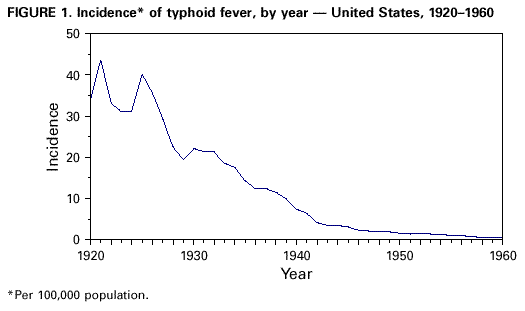
Declines in Deaths from Heart Disease and Stroke

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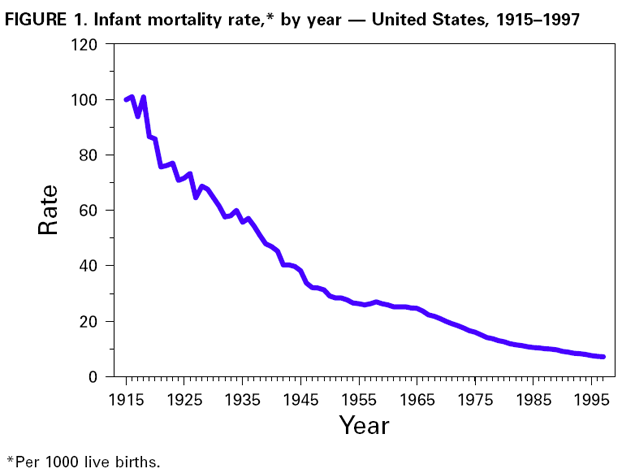
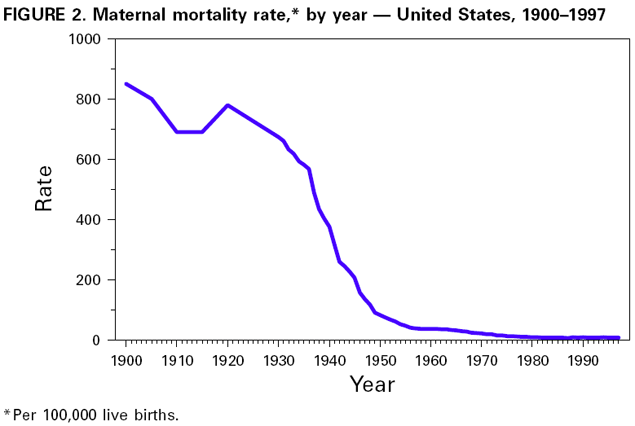
Change in CV risk factors over the years

* Adults aged 20-74 years with hypertension
  + 1960-1962 37% 
  + 1988-1994 23%
* Adults aged 20-74 years with high blood cholesterol
  + 1960-1962 32% 
  + 1988-1994 19%
* Adults aged 18+ years who are current smokers 
  + 1965 42% 
  + 1995 25%
* Persons who are overweight 
  + 1960-1962 24% 
  + 1988-1994 35% (significant increase)
* Number of physicians indicating cardiovascular diseases as their primary area of practice
  + 1975 5,046
  + 1996 14,304

Safer and Healthier Foods

* Nutrition
  + Discovery of essential nutrients and their roles in disease prevention : “Vital Amines”
* Food safety
  + Hand washing, sanitation, refrigeration, pasteurization, and pesticide application
  + Vaccines/antibiotics
*  

Healthier Mothers and Babies

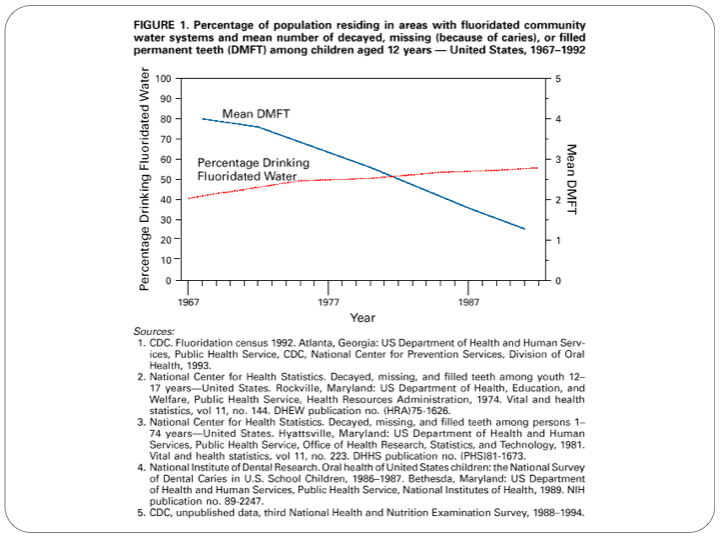
* Environmental interventions, improvements in nutrition, advances in clinical medicine, improvements in access to health care, improvements in surveillance and monitoring of disease, increases in education levels, and improvements in standards of living contributed to this remarkable decline
* Significant disparities by race and ethnicity persist.
*  

Family Planning (don't need to memorize the timeline)

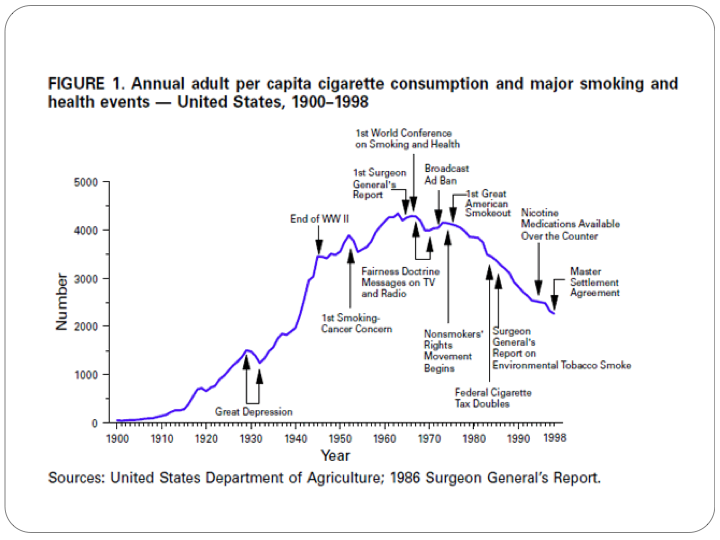
* Publicly supported family planning services prevent an estimated 1.3 million unintended pregnancies annually
* Milestones in family planning – United States, 1900-1997
* 1914: Margaret Sanger arrested for distributing birth control information
* 1916: First birth control clinic, Brooklyn, New York (closed after 10 days by the New York Vice  Squad)
* 1925: First manufacture in the United States of diaphragms
* 1928: Timing of ovulation established
* 1937: AMA endorses birth control
* 1937: First state (North Carolina) includes birth control in a public health program
* 1942: Planned Parenthood Federation of America established
* 1960: The birth control pill approved by Food and Drug Administration (FDA)
* 1960: Intrauterine device approved by FDA
* 1965: Supreme Court (Griswold vs. Connecticut) declares unconstitutional state laws prohibiting contraceptive use by married couples
* 1970: Family Planning Services and Population Research Act creates Title X of the Public Health Service Act
* 1972: Medicaid funding for family planning services authorized
* 1973: Supreme Court (Roe vs. Wade) legalizes abortion
* 1990:   Norplant®\* approved by FDA
* 1992: Depo-Provera® approved by FDA1993Female condom approved by FDA
* 1997: Emergency use of oral contraceptive pills approved by FDA

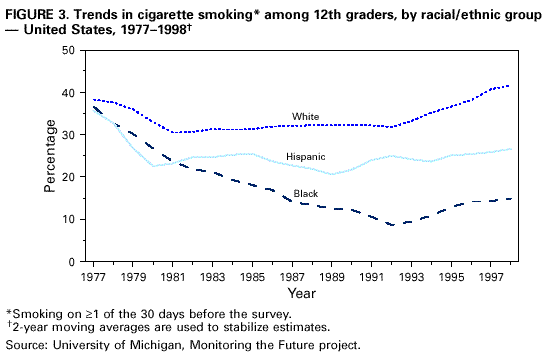
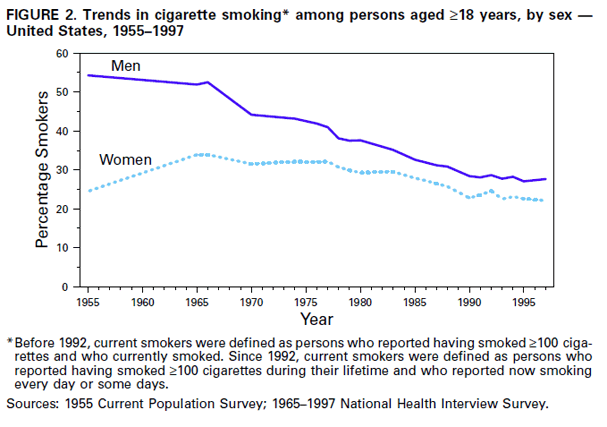
Fluoridation of Drinking Water

* Dr. Frederick S. McKay noted an unusual permanent stain or "mottled enamel" on the teeth of many of his patients.
  + After years of personal field investigations, McKay concluded that an agent in the public water supply probably was responsible for mottled enamel. McKay also observed that teeth affected by this condition seemed less susceptible to dental caries
* Classic example of clinical observation leading to epidemiologic investigation and community-based public health intervention.
* Water fluoridation remains the most equitable and cost-effective method of delivering fluoride to all members of most communities, regardless of age, educational attainment, or income level.



Tobacco as a Health Hazard





Ten Great Public Health Achievements— U.S. 2001-2010

* Vaccine-Preventable Diseases
* Prevention and Control of Infectious Diseases
* Tobacco Control
* Maternal and Infant Health
* Motor Vehicle Safety
* Cardiovascular Disease Prevention
* Occupational Safety
* Cancer Prevention
* Childhood Lead Poisoning Prevention
* Public Health Preparedness and Response

***THE ROOTS OF AMERICAN PUBLIC HEALTH***

1798—John Adams

* Signed into law the Act for the Relief of Sick and Disabled Seamen.
* 1799, Congress extended the Act to cover every officer and sailor in the U.S. Navy.
* The Act led to the gradual creation of a loose network of locally controlled marine hospitals along coastal and inland waterways.

Origin of The Surgeon General

* 1870—Hospital administration was centralized in the Marine Hospital Service,
  + Its headquarters in Washington, DC
  + Under the position of supervising surgeon (later Surgeon General).

1871—John Maynard Woodworth

* First Surgeon General
* Adopted a military model for his medical staff as part of  system reform.
* Instituted examinations for applicants, put physicians in uniforms, and created a cadre of mobile, career-service physicians who can be assigned to various marine hospitals.

National Quarantine Act

* 1878—The prevalence of major epidemic diseases such as smallpox, yellow fever, and cholera spurred Congress to enact the National Quarantine Act to prevent the introduction of contagious and infectious diseases into the United States.
* Congress later extended the Act to prevent the spread of disease among the states. The task of controlling epidemic diseases through quarantine and disinfection measures, as well as immunization programs, fell to the Marine Hospital Service.

The Commissioned Corps

* 1889—Legislation formalized the Commissioned Corps as the uniformed services component of the Marine Hospital Service.
* Congress organized Corps officers along military lines, with titles and pay corresponding to Army and Navy grades.

Public Health and Marine Hospital Service

* 1902—Name of the Marine Hospital Service expanded to Public Health and Marine Hospital Service to reflect growing responsibilities.
* The Service now carried out the medical inspection of arriving immigrants, such as those landing at Ellis Island in New York, as well as former State quarantine responsibilities.
* Commissioned Corps officers played a major role in fulfilling the Service's commitment to preventing disease from entering the country.

Public Health Service

* 1912—Name of the Public Health and Marine Hospital Service shortened to the Public Health Service (PHS).
* Legislation enacted by Congress broadened the powers of the PHS by authorizing investigations into human diseases (such as tuberculosis, hookworm, malaria, and leprosy), sanitation, water supplies, and sewage disposal.

New Developments

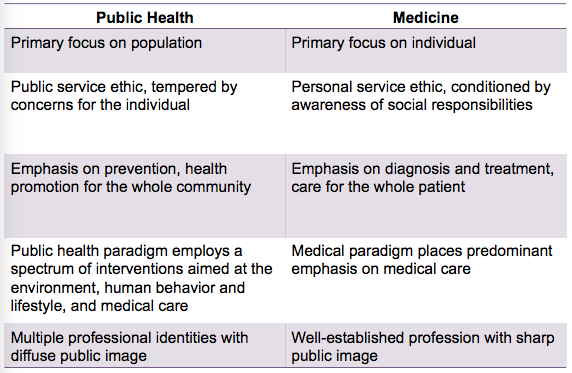
* 1930 and 1944: Corps officers expanded to include engineers, dentists, research scientists, nurses, and other health care specialists, as well as physicians.

Today’s Commissioned Corps

* Today—The Commissioned Corps continues to fulfill its mission to protect and promote the public health of our Nation.
* More than 6,500 active-duty officers
* Today’s mission: the Corps is working to create a global world free of preventable disease, sickness, and suffering.

***PART DEUX: CHALLENGES FOR YOU, PUBLIC HEALTH AND YOUR COMMUNITY***

Perspectives of Public Health and Medicine: AAMC



What Will Medical Practice Look Like In The Future?

* Shortage of public health trained professionals in the field (Center for Studying Health System Change)
* Physician shortage to quadruple within decade (Association of American Medical Colleges)
* The number of physicians practicing in governmental public health should be doubled (Institute of Medicine)

***THE NATURAL THREAT: NEW MADRID***

* Where?
  + The New Madrid region is located in the middle of the vast North American tectonic plate.
  + In contrast to plate boundary settings like the coasts of California or Alaska
* 1811 and 1812
  + The 1811 and 1812 New Madrid Earthquakes: most intense intraplate earthquake series to have occurred in the contiguous USA
  + Named for the Mississippi River town of New Madrid
  + Felt strongly over roughly 50,000 square miles, and moderately across nearly 1 million square miles.
    - The1906 San Francisco earthquake was felt moderately over roughly 6,000 square miles.
* Latest Research
  + Research out of Virginia Tech shows a large scale New Madrid quake (7.7 magnitude) could result in 80,000 injured, 3,500 fatalities and millions of people displaced.
  + Due to the extensive damage to critical infrastructure and buildings, 2 million people would seek shelter.  
* Results
  + **Tennessee, Arkansas, and Missouri: most severely impacted.**
  + **Illinois and Kentucky are also impacted, though not as severely**
  + **Nearly 715,000 buildings are damaged**
  + **About 42,000 search and rescue personnel**
  + **3,500 damaged bridges**
  + **Nearly 425,000 breaks and leaks to both local and interstate pipelines.**
  + **~2.6 million households without power after the earthquake.**
  + **Nearly 86,000 injuries and fatalities result from damage to infrastructure.**
  + **Nearly 130 hospitals are damaged and most are located in the impacted**  **counties near the rupture zone.**
  + **Hampered: Search and rescue as well as evacuation.**
  + **Roughly 15 major bridges unusable.**
* 3 days Later
  + 7.2 million people are still displaced and 2 million people seek temporary shelter.
  + Direct economic losses for the eight states total nearly $300 billion
  + Indirect losses may be at least twice this amount.
* Odds
  + It is not possible, however, to make specific predictions of when a large earthquake might strike.
  + USGS estimates the chance of having an earthquake similar to one of the 1811–12 sequence in the next 50 years is about 7 to 10 percent, and the chance of having a magnitude 6 or larger earthquake in 50 years is 25 to 40 percent.
  + The odds of another 8.0 event within 50 years in the New Madrid zone are between 7 and 10 percent, geologists said in 2005.

***THE INFECTIOUS DISEASE THREAT: PANDEMIC***

* A Severe (1918-like) Pandemic
  + 90 million ill
  + 45 million needing medical care
  + 9.9 million hospitalizations
  + 1.5 million needing ICU
  + 743,000 ventilators
  + 1.9 million deaths
* The 4th Week
  + PODs: Manning requirements
    - **Point of Distribution (exam Q)—where the medicine and tx are distributed**
      * **This is where vaccines, etc would be given to large #’s of ppl in an emergency**
  + ACS: Manning requirements
  + Healthcare on the brink
    - Your hospitals should have planned for triple the normal critical care capacity
    - Your hospitals should have been able to provide EMCC for 10 days without outside support
* Illinois
  + Potential Pandemic Flu Deaths and Hospitalizations in IL (15-35% attack rate)
    - Projected dead: 4,000-9,000
    - Projected hospitalized: 12,000-38,000
    - Projected outpatient: .75 million-2 million
    - Projected cases: 2 million-4.5 million
* New York State
  + 19 million
  + Severe scenario (6 week outbreak)
    - 771,000 admissions
    - 153,000 deaths
    - Ventilator shortfall: 12,000

Now what?

* Prioritization of Care
* Allocation of Scarce Resources
* Catastrophic Medicine
* What is the trigger or triggers that allow us to deviate from disaster medicine to catastrophic medicine ?
  + From individual care to communal care?
* Who decides?

Looking at these issues at 3 phases...

* Pre-hospital
  + To ED
  + To ACS
  + To Hospice
* ED
  + Palliative
  + Admit
* Intra-hospital
  + Withdrawal of care

Ethical Considerations in a Pandemic Event

* If there’s no plan to allocate scarce resources and to ration care...
  + Is that unethical? 
  + Subsequent actions
    - Arbitrary
    - Inconsistent
    - Uninformed
    - Easily influenced
    - Secretive (“Double secret probation”)

Crisis standards of care

* A substantial change in usual healthcare operations and the level of care it is possible to deliver, which is made necessary by a pervasive (e.g., pandemic influenza) or catastrophic (e.g., earthquake, hurricane) disaster.
* Not a choice
* Failure to adopt crisis standards of care – is very likely to result in greater death, injury or illness.

Disaster & Catastrophe: The Difference

* Disaster: The patient
  + Providing scarce resources appropriately given the severity of the  condition and the likelihood of recovery
  + Deliver the most basic level of care based upon established evidence-based outcomes
    - No regard to age, race, gender, religion, ethnicity, social worthiness, etc.
  + Exceptions
    - Children
    - Pregnant with viable fetus
* Catastrophe: The patient & the public welfare
  + Balance between the individual and The Common Good

A Delicate Balance

* Individual liberties
* Protect public from harm
* Proportionality
* Privacy
* Duty to provide
* Reciprocity
  + Support those who support
* Equity
  + All with equal claim
* Trust
* Solidarity
  + We’re all in it together
* Stewardship
  + For those in governance

**Key Components of an Ethical Framework (QUESTION ON TEST)**

* Fair
  + Reflects community’s values
* Transparent
* Accountable
* Consistent
* Flexible
* Proportional

Guiding ethical decision-making

* Reasonable
* Transparent
* Inclusive
* Responsive
* Accountable
  + Canada
* Duty to care
* Duty to steward resources
* Duty to plan
* Distributive justice
  + One plan for all
* Transparency
  + NYS

Severe Pandemic

* Catastrophe
  + Shifting from individual care to communal care
  + “Medical staff...will be expected to change the paradigm of care....a duty to the population as opposed to the individual.”
* Objectives
  + Care for the patient
  + Maintain integrity of the community
* Where’s the balance?
  + Who provides the balance?

Decision to ration care

* Requires an ethical framework
  + Integrate abstract principles with concrete dilemmas to arrive at an  acceptable solution
  + Utilitarian
    - Scarce resources to those who would likely benefit
  + Egalitarian (intrinsic)
    - Everyone equal
    - Lottery system
    - First-come-first-served
  + Instrumental (extrinsic)
    - Scare resources to those who would advance the survival of the infrastructure

EMS calls

* Absenteeism: 24% 
* Director: Dead
* Medical Director: ICU on a vent
* Requires dispatch/transport guidelines
  + Transport/No Transport
  + Transport guidelines
    - Hospital & elsewhere

911: Dispatch or Not?

* 76 y-o M
  + Achy chest pain; SOB
  + Multiple medical problems
* 42 y-o F
  + Achy chest pain; SOB
  + PMH: hypertension
* 16 y-o M
  + Achy chest pain; SOB
  + Asthmatic

Cops call 911: Dispatch or Not?

* MVA
  + 80s
    - Hit head; neck pain
  + 42
    - Hit head; neck pain
  + 16
    - Hit head; neck pain
* Abdominal pain x 2 hours in
  + 76 yo with COPD and prostate Ca
  + 76 yo with hypertension and heart disease
  + 76 yo renal dialysis patient
  + 76 yo ventilator-dependent
  + 76 yo previously healthy golfer

Proposed EMS Inclusion Criteria

* The patient must have 1 of the following
* A. Requirement for invasive ventilatory support
  + Refractory hypoxemia (SpO2 < 90% on non-rebreather mask or FIO2 > 0.85)
  + Clinical evidence of impending respiratory failure
  + Inability to protect or maintain airway
* B. Hypotension (systolic blood pressure < 90 mm Hg or relative hypotension) with clinical evidence of shock (altered level of consciousness, decreased urine output or other evidence of end-organ failure) refractory to volume resuscitation
* TRANSPORT

EMS: ED Exclusion Criteria

* The patient is excluded from admission or transfer to critical care if *any of the following is present:*
* A. Severe trauma
* B.Severe burns of patient with any 2 of the  following:
  + Age > 60 yr
  + > 40% of total body surface area affected
  + Inhalation injury
* C. Cardiac arrest
  + Unwitnessed cardiac arrest
  + Witnessed cardiac arrest, not responsive to electrical therapy (defibrillation or pacing)
  + Recurrent cardiac arrest
* D. Severe baseline cognitive impairment
* E. Advanced untreatable neuromuscular disease
* F. Metastatic malignant disease
* G. Advanced and irreversible  immunocompromise
* H. Severe and irreversible neurologic event or condition
* I. End-stage organ failure meeting the following criteria:
  + *Heart:* NYHA class III or IV heart failure
  + *Lungs:* Severe COPD, CF, etc.
  + *Liver:* Jaundice, ascities
* J. Age > 85 yr
* K. Elective palliative surgery  CMAJ

ED Non-Admission Criteria

* The patient is excluded from admission or transfer to critical care if *any of the following is present:*
* A. **Severe trauma**
* B. **Severe burns** of patient with any 2 of the  following:
  + Age>60yr
  + > 40% of total body surface area affected
  + Inhalation injury
* C. **Cardiac arrest** 
  + Unwitnessed cardiac arrest
  + Witnessed cardiac arrest, not responsive to electrical therapy (defibrillation or pacing) 
  + Recurrent cardiac arrest
* D. **Severe baseline cognitive impairment**
* E. **Advanced untreatable neuromuscular disease**
* F. **Metastatic malignant disease**
* G. **Advanced and irreversible**  **immunocompromise**
* H. **Severe and irreversible neurologic event or condition**
* I. End-stage organ failure meeting the following criteria:
  + *Heart*: **NYHA class III or IV heart failure**
  + *Lungs* 
    - **COPD** with FEV1 < 25% predicted, baseline
    - PaO2 < 55 mm Hg, or secondary pulmonary hypertension
    - **Cystic fibrosis** with postbronchodilator FEV1 < 30% or baseline PaO2 < 55 mm Hg
    - **Pulmonary fibrosis** with VC or TLC < 60% predicted, baseline PaO2 < 55 mm Hg, or secondary pulmonary hypertension
    - **Primary pulmonary hypertension** with NYHA class III or IV heart failure, right atrial pressure > 10 mm Hg, or mean pulmonary arterial pressure > 50 mm Hg
  + *Liver:* **Child–Pugh score 7**
* J. **Age>85yr**
* K. **Elective palliative surgery**

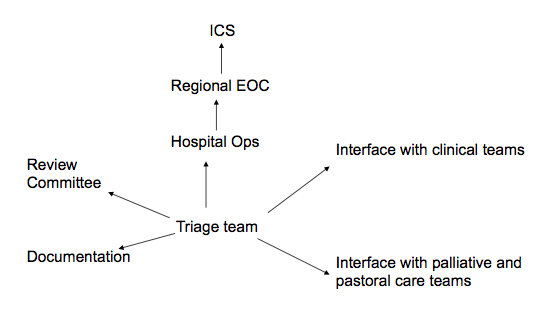
Child-Pugh (Liver Disease)

* Total bilirubin
* Serum albumin
* INR
* Ascites
* Encephalopathy
* 1-3 points apiece
* Points One year survival Two year survival
  + 5-6 100% 85%
  + 7-9 81% 57%
  + 10-15 45% 35%

Who meets your ED Exclusion Criteria?

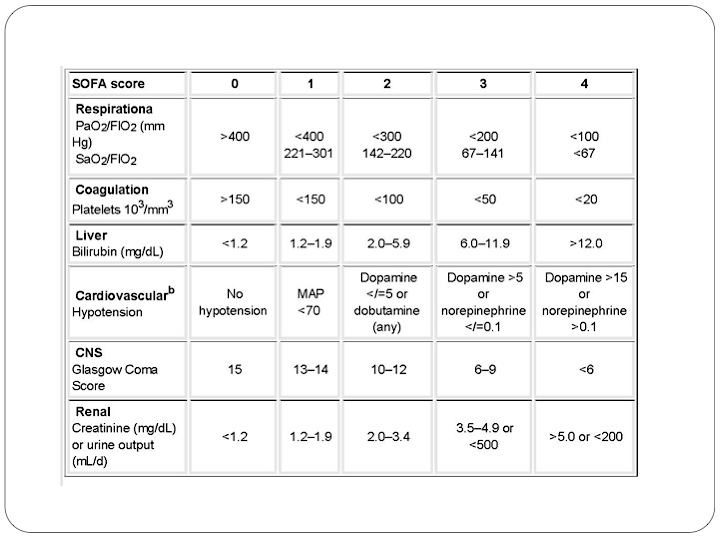
* House Fire Victim
  + 16 yo F
  + 45% TBSA (total body SA) 2nd-3rd degree burns
  + GCS:10
    - GCS: Glasgow coma scale—gives conscious state of a person
  + Stridor
  + Soot around face and mouth
  + VS: 124-34-146/78
  + SaO2: 86%
* Febrile geriatric patient
  + Nursing Home
  + 101-116-28-92%-90/60
  + Alzheimer's
  + Coughing, gagging, vomiting
* Young Mom with Fever and 3 kids
  + 32
  + Smoker
  + Recently diagnosed with breast CA
  + Had seizure 2 weeks ago and is scheduled for a Brain MRI tomorrow
  + 103-100-120/86-24-92%
* Former Mayor: Cough, weak, black stools
  + 88 yo
  + 101.8-120-102/54-28-94%
* Child with cystic fibrosis: SOB & Fever
  + 15 yo
  + 102.4-124-26-98/56-88%
  + Baseline PaO2: 53 mmHg
* Quadriplegic-Vent-dependent: Fever, Dyspnea, and dehydrated
  + 28 yo
  + Marine
  + Injured 2° IED in Afghanistan
  + 102.2-134-32-90/60-92%
* Cardiac Arrest
  + Mid-forties
  + Found in ED bathroom
  + Not sure how long
  + VS: 0-0-0-0-0

Can we harvest ventilators from certain chronically-ill, permanently disabled patients in certain extended care facilities?

* Who decides
* MVA Vic-Steering wheel injury
  + 20s
  + Flail chest
  + EMS
  + Spinal precautions, IVs
  + 128-40 (shallow)-60/0-76%
  + Loses VS at ED ambulance bay
* **AIS Score Injury**
  + 1 Minor
  + 2 Moderate
  + 3 Serious
  + 4 Severe
  + 5 Critical
  + 6 Unsurvivable
* MVA Vic-Steering wheel injury
  + 20s
  + Flail chest
  + EMS
  + Spinal precautions, IVs
  + 128-40 (shallow)-60/0-76%
  + AIS: 5 (Critical)
  + FAST: Blood in peritoneum (tons)
  + How much blood to allot?
* Frequent Flyer- Weak, Dizzy & SOB!
  + 62
  + Smoker-Drinker
  + All around good time girl
  + CRF-Dialysis
  + Non-compliant
  + Pulmonary edema
  + 102.8-156-38-80/40-90%
* Overdose
  + 18 yo
  + Cocaine, heroin, ETOH, Mom’s digoxin
  + Suicide note
  + No more than 1.5 hours ago
  + 96.8-40-8-76/46-86%
* Should all Nursing Home patients be DNRCC?
  + Who decides
  + What is the process?
* ICU-Type Patients
  + Withdrawal of Care
* Decision-Makers
  + Triage Officer-Physician
  + CCN
  + RT and/or Pharmacist
  + Support personnel
  + Others?Attorneys? Religious? Ethicist?
  + Shifts: 12-16 hours
  + 24-7
  + Appeal process?
  + QA process
* 
  + ICS: Incident Command System

SOFA: Sequential Organ Failure Assessment Score

* Objectively quantifies the degree of organ dysfunction over time in order to evaluate the time course of the severity of dysfunction
* The SOFA score combines a clinical assessment of 2 organ systems, cardiovascular system and central nervous system, with laboratory measurements for evaluation of 4 other organ systems:  
  + respiratory, hematologic, liver, renal
* The greater the SOFA score for each organ, the greater the risk of death;
* Six-organ dysfunction/failure score measuring multiple organ failure daily.
* Each organ is graded from 0 (normal) to 4 (the most abnormal), providing a
* Daily score of 0 to 24 points.
* Independent of the initial score, an increase in SOFA score during the first 48 hours in the ICU predicts a mortality rate of at least 50%.



SOFA Triage

* ***•Blue****: High probability of mortality; should be discharged from critical care and should receive medical management and palliative care as appropriate;.*
  + Initial: Exclusion criteria *or SOFA > 11*
  + 48 hours: Exclusion criteria *or SOFA > 11 or SOFA 8-11 unchanged*
  + 120 hours: Exclusion criteria *or SOFA > 11 or SOFA < 8 unchanged*
* ***Red****: Highest priority for critical care*
  + Initial: SOFA ≤ 7 *or single organ failure*
  + 48 hours: SOFA < 11 and decreasing
  + 120 hours: SOFA < 11 and decreasing progressively
* ***Yellow****: Intermediate priority for critical care* 
  + Initial: SOFA 8-11
  + 48 hours: SOFA < 8 unchanged
  + 120 hours: SOFA < 8 with minimal decrease (< 3 point decrease in 72 hours)
* ***Green****: Low probability of mortality; defer admission/ discharge from critical care*
  + Initial: no significant organ failure
  + 48 hours: no longer ventilator dependent
  + 120 hours: no longer ventilator dependent

MSOFA

* The score eliminates the platelet count, replaces partial pressure of arterial oxygen (PaO2) with arterial oxygen saturation measured by a pulse oximeter (SpO2), and replaces serum bilirubin with clinical assessment of scleral icterus or jaundice .
* The only laboratory value required for the MSOFA is creatinine
* The MSOFA predicts mortality as well as the SOFA and is easier to implement in resource constrained settings, but using either score as a triage tool would exclude many patients who would otherwise survive

Exclusion criteria

* Very high risk of death
* Little likelihood of long-term survival
* Low likelihood of benefit from critical care resources
* Based on
  + SOFA + Severity of Chronic Illness

One Exclusion Criteria model using SOFA

* Must have an 80% risk of death
  + SOFA score ≥ 15 any time
  + Mean SOFA score ≥ 5 for 5 days or more + a flat or rising trend
  + 6 or more organ failures t any time

Hospital IC

* Down to one ventilator

Withdrawal of life support

* 60-y-o patient on ventilator
  + SOFA scores over 3 days: worse (20)
* 20-y-o in ER needs vent
* Are criteria met to remove vent from 1 and give it to the other?
* 20-y-o patient on ventilator
  + SOFA scores over 3 days: worse (20)
* 70-y-o in ER needs vent
* 60-y-o Congresswoman on ventilator
  + SOFA scores over 3 days: worse (20)
* 20-y-o prisoner in ER needs vent
* 30-y-o convicted rapist on ventilator
  + SOFA scores over 3 days: worse (20)
* 60-y-o state senator in ER needs vent
* Are criteria met to remove vent from 1 and give it to the other?
* Who decides
* Who actually does it
* What are the legal ramifications?

What are the steps to recovery?

* Achieving “The New Normal”
* Educational venues: closed
* Public gatherings: suspended
* Religious services: curtailed
* Mass graves
* Alternative care sites: operational
* Possible retribution
* Mental health

***A MULTI-NODAL UNI-JURISDICTIONAL ATTACK***

* Historical Perspective
  + Madrid, 2004
  + London, 2005
  + Mumbai, 2008

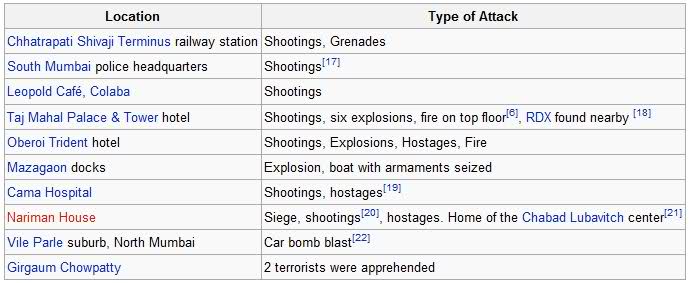
Madrid

* Madrid train bombings (11-M)
  + Nearly simultaneous, coordinated bombings against the commuter train system of city of Madrid, Spain
  + On the morning of 11 March 2004 – three days before Spain's general elections.
  + The explosions killed 191 and wounded 1,800.

London: 7 July 2005

* Thursday morning
* 4 terrorists detonated four bombs
* 3 in quick succession aboard London Underground trains across the city
* A fourth on a double-decker bus
* Fifty-two civilians plus the 4 bombers were killed in the attacks
* Over 700 more were injured.

**Mumbai, 11/26/2008**



Toledo, May 2

* Breaking News 9:11 PM: A series of ambulance bombs and 10-20 assailants armed with assault rifles and grenades have just attacked all the ERs in the Toledo-area.
* Dead are in the hundreds.
* Wounded may be near 1000.
* Alleged assailants have been neutralized.
* ER evacuations, search-and-rescue under way

What is local Public Health doing?

* ICS Overview
  + Incident Command Structure or ICS is a systematic tool used for the command, control, and coordination of emergency response
  + ICS is Flexible and Scalable – ICS is organized in such a way as to expand and contract as needed by the incident scope, resources and hazards. It can be used for any size emergency.
* ICS Characteristics
  + **Common Terminology**
  + **Integrated Communications**
  + **Modular Organization**
  + Management by Objectives
  + Incident Action Planning
  + **Manageable Span of Control**
  + Incident Facilities and Locations
  + Comprehensive Resource Management
  + Establishment and transfer of Command
  + **Chain of Command and Unity of Command**
  + **Unified Command**
  + Dispatch/Deployment
  + Accountability
  + Information and Intelligence Management
* Incident Command System (ICS)

